

Attachment 4

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Parking Management

Strategies for More Efficient Use of Parking Resources

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**TDM Encyclopedia**  
 Victoria Transport Policy Institute

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About This Encyclopedia
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*This chapter describes various management strategies that result in more efficient use of parking resources. For more information on this subject see the book "Parking Management Best Practices," published by Planners Press (Litman, 2006), and the report "Parking Management: Strategies, Evaluation and Planning" available from the Victoria Transport Policy Institute at [www.vtpi.org/park\\_man.pdf](http://www.vtpi.org/park_man.pdf).*

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### Description

*Parking Management* includes a variety of strategies that encourage more efficient use of existing parking facilities, improve the quality of service provided to parking facility users and improve parking facility design. Parking Management can help address a wide range of transportation problems (see Parking Evaluation and Parking Solutions), and help achieve a variety of transportation, land use development, economic, environmental objectives. Specific Parking Management strategies are described below.

Specific parking management strategies are described below.

### **Share Parking**

Sharing parking spaces typically allows 20-40% more users compared with assigning each space to an individual motorist, since some potential users are usually away at any particular time. For example, 100 employees can typically share 60-80 parking spaces, since at any particular time some employees are on leave, away on business, or using an alternative commute mode. Even greater reductions are possible with mixed land uses, since different activities have different peak demand times. For example, a restaurant can share parking with an office complex, since restaurant parking demand peaks in the evening while office parking demand peaks during the middle of the day. Public parking facilities, including on-street parking spaces, can usually be shared efficiently among many destinations.

In lieu fees allow developers to pay into a fund for off-site municipal parking facilities instead of providing their own on-site parking (Shoup, 1999a). This results in more efficient Shared Parking facilities, and allows parking facilities to be located where they most optimal for urban design.

The appropriate number of motorists that can be assigned to a particular number of parking spaces depends on several factors. In general, the more diverse the users and the larger the facility, the more parking spaces can be shared.

### **Regulate Parking Use**

Parking facilities can be managed and regulated to encourage more efficient use of parking resources and more efficient travel. This often involves making the most convenient parking spaces available to certain higher-value uses. Below are typical strategies.

- Regulate based on the type of vehicles or users. For example, during peak periods dedicate the most convenient spaces for service vehicles, customers, Rideshare vehicles, and vehicles used by Disabled People.
- Limit parking duration (5-minute loading zones, 30-minutes adjacent to shop entrances, 1- or 2-hour limits for on-street parking in commercial areas), to encourage turnover and favor shorter-term users (since higher priority trips, such as deliveries and shopping, tend to park for shorter duration than lower priority trips).
- Encourage employees to use less convenient parking spaces (such as parking lots at the urban fringe) during peak periods, in order to leave the most convenient spaces for customers. Develop a system to monitor use of parking facilities and send reminders to employees who violate these guidelines.
- Charge higher Parking Prices and shorter payment periods for more convenient spaces. For example, in prime central locations charge 25¢ for each 15-minute period with a two-hour maximum, while at the fringe charge \$2.00 for 4-hours, with no smaller time periods available.
- Implement more flexible Pricing Methods which allow motorists to pay for only the amount of time they park, which makes shorter parking periods relatively attractive.
- Limit use of on-street parking to area residents, or provide discounts to residents for priced parking.
- Limit on-street parking of large vehicles (e.g., vehicles over 22 feet long or trailers) to ease traffic flow and discourage use of public parking for storage of commercial vehicles.
- Prohibit on-street parking on certain routes at certain times (such as on arterials during rush hour), to increase traffic lanes.

### **More Accurate and Flexible Parking Standards**

Current parking requirements are often inflexible and generous, applied with little consideration to specific geographic and demographic factors that affect parking demand at a particular location (Shoup, 1999; CTR, 1999;

Litman, 1999; Millard-Ball, 2002). Parking requirements are based on parking generation studies that are mostly performed at new, suburban sites with unpriced parking, resulting in standards that tend to be excessive in urban areas with more multi-modal transportation, where parking is priced, and at sites with TDM programs (Shoup, 2002). Current minimum parking standards are often inflexible, applied with little consideration to specific geographic, demographic, economic and management conditions.

In many situations, parking standards for new facilities, and the supply of parking at existing facilities, can be reduced without creating significant parking problems, particularly if implemented as part of an integrated parking management program. *More accurate and flexible parking requirements* means that parking standards reflect the parking demand and costs at a particular location, taking into account geographic, demographic, economic and management factors. This allows parking requirements to be reduced in exchange for implementation of specific parking and mobility management strategies, such as:

- Shared Parking.
- Regulations that encourage more efficient parking facility use.
- Priced Parking and Parking Cash Out.
- Overflow parking plans to deal with occasional peaks.
- Transit and Rideshare improvements.
- Smart Growth that increases land use Accessibility.
- Other TDM strategies that affect Parking Demand

## Parking Maximums

Some communities limit on the maximum amount of parking capacity allowed at particular sites or within a particular area, particularly in growing Commercial Centers (Millard-Ball, 2002; Manfille and Shoup, 2004). This can be in addition to, or instead of, minimum parking requirements that are commonly imposed. Below are some examples (K.T. Analytics, 1995):

- *Portland*. In 1975, the City of Portland set an overall cap of approximately 40,000 parking spaces downtown, including existing and new parking facilities. The cap was increased to about 44,000 spaces by the 1980's and increased again in the 1990's. The City is generally satisfied with its parking policies and believes it has helped increase transit use from 20-25% in the early 1970's to 48% in the mid-1990's.
- *San Francisco*. The city of San Francisco's "Transit First" policy allows parking to consume only up to seven percent of a building's gross floor and new buildings must have an approved parking plan prior to receiving an occupancy permit. In some cases, only short term parking is approved; in another, a mix of long, short and carpool parking was approved. This policy has helped prevent increased peak vehicle traffic despite considerable office growth.
- *Boston*. In 1977, the City of Boston adopted a freeze on commercial parking open to the public, but not parking reserved for individuals or a company use within office buildings. While the number of commercial spaces have not increased, there was a 26% increase in exempt spaces between 1984 and 1987 alone and motor vehicle traffic increased dramatically along major corridors to the city.
- *Seattle*. The City of Seattle allows a maximum of one parking space per 1,000 sq. ft. of downtown office space.

## Remote Parking and Park & Ride

*Remote Parking* involves encouraging motorists (particularly commuters and residents) to use off-site or fringe parking facilities (typically located a few blocks from a Commercial Center), so the most convenient spaces are available for priority users (such as service vehicles and customers). Motorists usually prefer the closest parking location, but given a choice some will park further away to save on parking fees. In some situations (airports, large entertainment centers, and large commercial centers), Shuttle Services may allow longer distances between parking facilities and destinations. Strategies to accomplish this include:

- Information (signs, maps and brochures) on remote parking availability.
- Regulations and pricing that encourages long-term parkers to use urban fringe facilities
- Shuttle services, free transit zones and pedestrian facilities to improve access to remote parking facilities.

Park & Ride consists of parking facilities at transit stations, bus stops and highway onramps, particularly at the urban fringe, to facilitate transit and rideshare use. Parking is generally free or significantly less expensive than in urban centers.

### Improve User Information and Marketing

Many parking problems result, in part, from inadequate user information and Marketing. Motorists need convenient and accurate information on parking availability and price, including what parking facilities exist near a destination, whether spaces are available in a particular facility at a particular time, the price they will need to pay, and whether there are less expensive alternatives nearby. Produce a Transportation Access Guide that provides concise information on how to access a particular destination by various modes, including parking availability and price. Parking information can include maps, signs, brochures and various types of Electronic Communication systems to provide information to motorists on parking facility location, availability (whether a parking lot is full), service options, and price. This can help improve user convenience and security, increase the functional supply of parking, address many objections to specific parking management strategies. For example, motorists may be less resistant to parking regulation, pricing and reduced supply in a particular location if they can easily obtain information on alternatives parking and travel options that can meet their needs.

### Smart Growth and Location Efficient Development

Smart Growth (also called New Urbanism) is a general term for policies that integrate transportation and land use decisions, for example by encouraging more development within existing urban areas where additional growth is desirable, and discouraging low-density, automobile dependent development at the urban fringe. Smart Growth can help create more accessible, less automobile-dependent land use patterns. Smart Growth is an alternative to urban sprawl. Smart Growth tends to reduce per capita vehicle ownership and encourage use of alternative travel modes, and so it can reduce parking requirements and support other parking management strategies.

Location Efficient Development means development that is designed and managed to take advantage of more Accessible, multi-modal locations (good walking, cycling and transit). Parking requirements can be reduced in such areas due to reduced automobile ownership and use. Location Efficient Mortgage (LEM) means that lenders take into account transportation cost savings by households that choose more accessible locations when evaluating borrowing ability (Hoeveler, 1997). This encourages infill, multi-modal development.

### Improve Walkability

The usable parking supply serving a destination can often be increased by improving Walkability (the quality of the walking environment). Walkability takes into account sidewalk, path and roadway conditions; land use patterns; social acceptance; security and comfort for walking. Improved walking conditions expands the range of Shared Parking, and encourages *park once* trips, which means that visitors park their vehicles and walk to several destinations, rather than driving to, and parking at, each destination. There are many specific ways to Improved Walkability:

- Improved sidewalks, crosswalks and paths.
- Creating pedestrian shortcuts, such as mid-block paths and connections between dead-end streets.
- Improve facility designs to accommodate special needs, including people using wheelchairs, walkers, strollers and hand carts.
- Provide covered walkways, loading and waiting areas with shade from hot sun and protection from rain.
- Street furniture (e.g., benches) and design features (e.g., human-scale street lights).
- Implement traffic calming, speed reductions and vehicle restrictions.
- Address pedestrian Security Concerns.
- Creating more attractive, interesting and clean walking areas.

### Transportation Management Associations and Parking Brokerage

Transportation Management Associations (TMAs) are private, non-profit, member-controlled organizations that provide transportation services in a particular area, such as a commercial district, mall, medical center or industrial park. Transportation Management Associations can provide a variety of services that encourage more efficient use of transportation and parking resources. TMAs allow small employers to provide Commute Trip Reduction services comparable to those offered by large companies. They are usually more cost effective than programs managed by individual businesses.

Transportation management associations can provide parking brokerage services, allowing businesses to share, trade, lease, rent and sell parking facilities. For example, a TMA can match businesses that have extra parking supply at a particular time with nearby businesses that need parking at that time. This helps businesses deal with changing parking demands, and allows businesses that implement successful trip reduction programs to save money if they end up with unused parking spaces.

### **Increase Capacity of Existing Parking Facilities**

Increase the number of spaces in existing parking facilities by:

- Using currently wasted areas (corners, edges, undeveloped land, etc.).
- Changing from parallel to angled parking.
- Sizing a portion of spaces for motorcycles and compact cars. Small size stalls (275 square feet) require about 20% less space than average stalls (325 square feet). Up to 25% of spaces can typically be sized for compact vehicles, resulting in a 5% increase in total parking capacity compared with all spaces being average size. Motorcycle parking can sometimes be located in an area that is too small for automobile parking spaces.
- Car stackers and mechanical garages use various types of lifts and elevators to increase the number of vehicles that can fit in a parking structure. They can nearly double the number of vehicles that can be parked in a given area, although they are only suitable for cars (most trucks, vans and SUVs are too high), and require an attendant to operate.
- Using valet parking services. This can increase parking capacity by 20-40% compared with self-park.

### **Implement TDM Programs**

Implement TDM programs to reduce vehicle trips, and reduce parking requirements at sites that implement such programs. For example, parking requirements can usually be reduced 10-30% at sites with Commute Trip Reduction programs. Parking Cash Out is particularly effective at reducing parking demand. Carfree and Location Efficient Development may provide parking spaces for Carsharing vehicles, each of which can substitute for several private automobiles, and therefore reduce total parking requirements.

### **Price Parking**

Parking Pricing means that motorists pay directly for using parking facilities. Parking Pricing may be implemented as a parking management strategy (to reduce parking problems in a particular location), as a mobility management strategy (to reduce vehicle traffic in an area), to recover parking facility costs, to generate revenue for other purposes (such as a local transportation program or downtown improvement district), or for a combination of these objectives. Use Improved Pricing Methods to improve user convenience, pricing flexibility and cost efficiency.

Cost-based parking pricing (i.e., prices set to recover the full cost of parking facilities) typically reduces parking demand 10-30% compared with unpriced parking. Pricing of commuter parking, and time variable-rates (higher rates during peak periods) is particularly effective at reducing peak use. Pricing of commuter parking, and time variable-rates (higher rates during peak periods) is particularly effective at reducing peak use. Charging motorists directly for parking is more economically efficient and fair (horizontal equity) than unpriced parking that results in cross-subsidies from consumers who drive less to those who drive more than average.

When parking is priced, it is often leased by the month, with significant discounts compared with short-term pricing. This encourages motorists who pay the fee to drive in order to get their money's worth. It is more efficient to rent parking in smaller time blocks (hourly or daily rates), or to prorate monthly leases by the portion of days parking facilities are used. For example, if full-time parking costs \$50 per month, commuters who only drive 3 days a week should only pay \$30. This gives motorists more options and a financial incentive to use alternative modes when

possible. Similarly, some parking facilities offer “Early Bird Specials,” which favors long-term parking – such discounts are appropriate for less convenient parking facilities, but not for parking at prime locations, which should be reserved for people parking for short-term errands.

Shoup (2005) provides the following guidelines for efficient parking pricing:

- Price parking for full cost recovery: at a minimum, all costs of building and operating parking facilities should be recovered from users. Prices may be higher to reflect the opportunity cost of land and to provide profits.
- Price the most convenient parking, such as on-street spaces, so occupancy averages 85-90%. Use variable fees, with higher rates during peak periods and lower rates during off-peak periods.
- Dedicate some or all of the revenue from on-street parking to benefit local businesses and residents.
- Unbundle parking from building rents, so occupants only pay for the number of parking spaces they want.
- Allow private developers and building managers to decide how much parking to provide at each destination, rather than relying on rigid regulations.

### **Commuter Financial Incentives (Parking Cash Out and Transit Benefits)**

Commuter Financial Incentives means that commuters are offered financial incentives to use alternative travel modes and reduce their use of parking facilities, particularly the most convenient parking spaces during peak periods.

*Parking Cash Out* means that commuters who are offered a free or subsidized parking space have the option of choosing the cash equivalent, and *Transit Benefits* means that employers help fund their employees' transit and rideshare fares. For example, employees might be able to choose between a free parking space, a monthly transit pass, a vanpool subsidy, or \$50 cash per month. These payments may be prorated, so for example, employees who drive 30% of the time receive a 70% cash-out payment. This creates a more neutral benefit with respect to travel mode, letting commuters decide which commute subsidy they prefer. These incentives tend to reduce automobile commuting by 15-25%, and are fairer, since they give non-drivers benefits comparable to those offered motorists.

Commuter Financial Incentive benefits represent the savings that result from reduced parking costs. Businesses that own adequate parking may perceive little short-term savings from reduced parking demand. For example, if Commuter Financial Incentives convince 20 employees to shift from driving to alternative modes the employer may simply have 20 unused parking spaces. However, over time most firms have opportunities to benefit financially from reduced parking demand: by reducing the amount of parking they lease with their building, to provide additional parking to accommodate growth, to lease or sell to other businesses, or to use the land for a new building, equipment storage, or greenspace. To make it easier for businesses to save from reduced employee parking demand, commercial leases can unbundle parking (parking spaces are leased separately rather than automatically included with building space), and list parking as a separate line item (parking rents are listed separately from building rents). Parking brokerage services, provided by a Transportation Management Association or other local business organization, can help employers capture financial savings from reduced parking use.

### **Unbundle Parking**

Unpriced parking is often “bundled” with building costs, which means that a certain number of spaces are automatically included with building purchases or leases. *Unbundling Parking* means that parking is sold or rented separately. For example, rather than renting an apartment for \$1,000 per month with two parking spaces at no extra cost, each apartment can be rented for \$850 per month, plus \$75 per month for each parking space. Occupants only pay for the parking spaces they actually need. This is more efficient and fair, since occupants save money when they reduce parking demand, are not forced to pay for parking they do not need, and can adjust their parking supply as their needs change.

For this to function efficiently, building owners must be able to lease or sell excess parking spaces (such as parking

brokerage services described below), and local officials should regulate nearby on-street parking to avoid spillover problems that could result if residents use onstreet parking to avoid paying rents for parking spaces.

### **Tax Parking Facilities or Their Use**

If governments must tax something, it may be appropriate to tax parking as a way to control demand and correct existing distortions that underprice parking. Taxes can be applied to parking spaces, parking subsidies and parking rental transactions. For example, a municipality can charge a special property tax of \$5 annually per parking space owned by businesses, \$10 annually per space provided free to employees, or a special sales tax of 20% on commercial parking transactions. For example, the city of San Francisco charges a 25% tax on commercial parking transactions ([www.ci.sf.ca.us/tax/parking.htm](http://www.ci.sf.ca.us/tax/parking.htm)). Municipalities could also charge a tax on curbcuts comparable to potential revenue foregone had the same curb area been devoted to priced on-street parking. This would encourage property owners to minimize the number and width of curb cuts, through access management and consolidation of driveways and parking facilities, which helps improve traffic flow and create more pedestrian friendly streetscapes.

2. It would encourage consolidation of curb cuts between property owners.

Parking tax reform can also be used to correct existing policies that undertax parking. For example, land devoted to parking is sometimes assessed at a lower rate than if the same land were used for buildings, on the assumption that rents are paid on buildings, while parking is an ancillary use. Taxing land devoted to parking at the same rate as building land gives businesses an incentive to reduce parking supply.

### **Control Parking Passes**

Parking passes sold or allocated to employees, officials or visitors should have clear limitations regarding where, when and by whom they may be used, and these limitations should be enforced. For example, it is often appropriate to limit parking pass use to a specific vehicle, individual, and area.

Employees, officials and volunteers are often allocated parking passes for use on official business. Such passes are sometimes abused, such as being used for personal trips, or loaned to other motorists. Such passes should be carefully controlled, with regular audits of their need and use.

### **Bicycle Parking**

Bicycle Parking, storage and changing facilities are important ways to provide convenience and security for cyclists at destinations. Bicycle parking improvements can reduce automobile parking and travel demand if inadequate bike storage is major deterrents to cycling. Effective bicycle parking requires a properly designed rack in an appropriate location for the type of use. There are many types of bicycle racks and lockers available.

### **Develop Overflow Parking Plans**

Excessive parking is often provided to meet infrequent peak demand that occurs during Special Events or other limited time periods. Parking requirements can be reduced by developing an overflow parking plan. This can include:

- Shared Parking arrangements during peak periods.
- Use of remote parking facilities with Shuttle Services.
- Promotion and pricing to encourage peak-period motorists to use remote parking.
- Promotion of alternative modes such as public transit and ridesharing to major events.
- Encourage employees to use remote parking sites or alternative modes during peak periods.
- Special parking regulation to favor priority vehicles (emergency, service, HOV, disabled, etc.)
- Improved walkability between destinations and nearby parking facilities.

### **Address Spillover Problems**

Generous and free parking is often justified in order to avoid “spillover” parking problems in nearby areas. Spillover



problems can be addressed directly with management, pricing and enforcement strategies. On-street parking can be limited to residents, which can be enforced by issuing permits to residents, or simply in response to complaints. Residential neighborhoods can be designated "Parking Benefit Districts," where on-street parking is priced (residents can be exempt), with revenues used for neighborhood enhancement or to reduce property taxes (Shoup, 1994 and 1995).

Another approach is to provide some sort of compensation to residents who experience parking problems. For example, a high school can send complementary sport event tickets to residents of nearby streets who bear spillover parking problems. Shoup (1995) proposes using revenues from on-street parking in ways that directly benefit neighborhood residents.

## Parking Facility Design

Parking facility design changes can address a variety of problems and concerns:

- *User information.* Add signs and wayfinding information within parking facilities.
- *User convenience.* Improve walkability within parking facilities, for example, by adding walkways, shading and covered shelter areas.
- *Aesthetics.* Create more attractive parking facilities, with landscaping, building, quality building materials, public art and other attractive design features (Smith, 1988).
- *Cleanliness.* Keep parking facilities clean and in good repair.
- *Stormwater management.* Use state-of-the-art stormwater management and pollution controls. Use on-site stormwater retention. Reduce total impervious surface and maximize greenspace. Use permeable pavement surfaces. (*Center for Watershed Protection; NEMO*; Booth and Leavitt, 1999)
- *Safety.* Design parking facilities with state-of-the-art safety design features and speed controls (Hamilton Associates, 1998)
- *Security Concerns.* Design parking facilities for maximum natural surveillance (i.e., visibility from the street or nearby buildings), adequate lighting, patrols, emergency alarms and closed circuit video observation.
- *Disabled Access.* Use state-of-the-art accessibility standards for parking and pedestrian facilities.

Table 1 summarizes these parking management strategies, and indicates the potential reduction in parking supply that they can typically provide.

**Table 1** Typical Parking Management Strategies

| Management Strategy                                                       | Description                                                                                                                                                                                                           |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Strategies That Result In More Efficient Use of Parking Facilities</i> |                                                                                                                                                                                                                       |
| Shared Parking                                                            | Parking spaces are shared by more than one user, allowing facilities to be used more efficiently.                                                                                                                     |
| Regulate Parking Facility Use                                             | More convenient and visible parking spaces are managed and regulated to give priority to higher-value trips, increase efficiency and user convenience.                                                                |
| More Accurate and Flexible Standards                                      | Reduce or adjust standards to more accurately reflect demand at a particular location, taking into account geographic, demographic and economic factors.                                                              |
| Parking Maximums                                                          | Establish maximum in addition or instead of minimum parking standards to avoid excessive parking supply.                                                                                                              |
| Remote Parking                                                            | Encouraging longer-term parkers to use off-site or fringe parking facilities, so more convenient spaces are available for priority users.                                                                             |
| Improving User Information and Marketing                                  | Provide convenient and accurate information on parking availability and price, using maps, signs, brochures and electronic communication.                                                                             |
| Smart Growth and Location Efficient Development                           | Encourage more clustered, mixed, multi-modal, infill development, which allows more shared parking and use of alternative modes.                                                                                      |
| Improved Walkability                                                      | Improve pedestrian conditions to allow parkers to conveniently access more parking facilities, increasing the functional supply in an area.                                                                           |
| Transportation Management Associations                                    | Transportation Management Associations are private, non-profit, member-controlled organizations that can provide variety of services that encourage more efficient use of transport and parking resources in an area. |
| Increase Capacity of Existing Parking Facilities                          | More parking spaces can sometimes be provided by using currently wasted space, sizing spaces for smaller vehicles and motorcycles, and using car stackers.                                                            |
| <i>Strategies That Reduce Parking Demand</i>                              |                                                                                                                                                                                                                       |

|                                                |                                                                                                                                                                                                 |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Transportation Demand Management Programs      | Various strategies and programs can encourage more efficient travel patterns, which reduces automobile trips and parking demand.                                                                |
| Parking Pricing                                | Charge motorists directly for using parking facilities, and set fees to encourage efficient use of parking facilities.                                                                          |
| Improve Parking Pricing Methods                | Use of more convenient and effective parking pricing techniques to make parking pricing more acceptable and cost effective.                                                                     |
| Commuter Financial Incentives                  | Parking cash out and transit benefits give commuters a financial incentives to shift modes and reduce parking demand.                                                                           |
| Unbundle Parking                               | Rent or sell parking spaces separately from building space, so occupants pay for just the number of parking spaces that they use.                                                               |
| Tax Parking Facilities                         | Impose special taxes on parking facilities and commercial parking transactions.                                                                                                                 |
| Improve Enforcement and Control                | Enforcement should be consistent, fair and friendly. Parking passes should have clear limitations regarding where, when and by whom they may be used, and these limitations should be enforced. |
| Bicycle Facilities                             | Supply bicycle parking, storage and changing facilities instead of some automobile parking spaces.                                                                                              |
| <i>Strategies that Reduce Negative Impacts</i> |                                                                                                                                                                                                 |
| Develop Overflow Parking Plans                 | Encourage use of remote parking facilities and promote use of alternative modes during peak periods, such as busy shopping times and major events.                                              |
| Address Spillover Problems                     | Address spillover parking problems directly with management, pricing and enforcement strategies.                                                                                                |
| Parking Facility Design and Management         | Improved parking facility design to address safety, stormwater management, user comfort, security and aesthetic objectives.                                                                     |

*This table summarizes various parking management strategies.*

Table 2 indicates the typical reductions in parking requirements provided by various parking management strategies, and indicates those that also tend to reduce vehicle traffic.

**Table 2 Typical Reductions in Parking Requirements and Vehicle Traffic**

| Strategy                                 | Parking Requirement Reductions |        |      | Reduce Vehicle Traffic |
|------------------------------------------|--------------------------------|--------|------|------------------------|
|                                          | Low                            | Medium | High |                        |
| Shared Parking                           | 10%                            | 20%    | 30%  |                        |
| Parking Regulations                      | 10%                            | 20%    | 30%  |                        |
| More Accurate Standards                  | 10%                            | 20%    | 30%  |                        |
| Parking Maximums                         | 10%                            | 20%    | 30%  |                        |
| Remote Parking                           | 10%                            | 20%    | 30%  |                        |
| Smart Growth                             | 10%                            | 20%    | 30%  | ✓                      |
| Walking and Cycling Improvements         | 10%                            | 20%    | 30%  | ✓                      |
| Increase Capacity of Existing Facilities | 5%                             | 10%    | 15%  |                        |
| Mobility Management                      | 10%                            | 20%    | 30%  | ✓                      |
| Parking Pricing                          | 10%                            | 20%    | 30%  | ✓                      |
| Improve Pricing Methods                  | NA                             | NA     | NA   | ✓                      |
| Financial Incentives                     | 10%                            | 20%    | 30%  | ✓                      |
| Unbundle Parking                         | 10%                            | 20%    | 30%  | ✓                      |
| Parking Tax Reform                       | 5%                             | 10%    | 15%  | ✓                      |
| Bicycle Facilities                       | 5%                             | 10%    | 15%  | ✓                      |
| Improve User Information                 | 5%                             | 10%    | 15%  | ✓                      |
| Improve Enforcement and Control          | NA                             | NA     | NA   |                        |
| Transportation Management Associations   | NA                             | NA     | NA   | ✓                      |
| Overflow Parking Plans                   | NA                             | NA     | NA   |                        |
| Address Spillover Problems               | NA                             | NA     | NA   |                        |
| Parking Facility Design                  | NA                             | NA     | NA   |                        |

*This table indicates the typical reductions in parking requirements it provides relative to conventional practices, and whether a parking management strategy tends to reduce vehicle traffic, thereby providing additional benefits. NA = Not Appropriate, indicating strategies that do not directly affect parking requirements.*

#### Wit and Humor

"If every place worth visiting had enough parking for all the people who wanted to visit, there would be no places left worth visiting."

## How It Is Implemented

Parking Management is usually implemented by local governments or individual businesses in response to specific parking and traffic problems. Some Parking Management programs are coordinated by regional governments. Concerns over an immediate parking problem will instigate development of a comprehensive parking planning process. Transportation engineers and planners, either within public agencies or hired as consultants, are usually responsible for performing parking studies, evaluating parking solutions and developing parking management plans.

Below is the typical process for developing a Contingency-Based parking management plan (TDM Planning):

1. Define general problems to be addressed (parking congestion, traffic congestion, excessive parking facility costs, poor pedestrian environments, etc.) and the geographic areas to be considered.
2. Perform the following studies:
  - A parking supply inventory (how many spaces exist of each type of parking: public and private, on- and off-street, short- and long-term, free and paid, etc.) for each geographic area.
  - A parking utilization study (what portion of each type of parking is used at various time, particularly peak-periods) for each geographic area.
  - Projections of how parking supply and demand are likely to change in the future, taking into account expected changes in land use, population, commercial activity, travel patterns, etc.
  - Use this information to identify when and where parking supply is or will be inadequate or excessive.
3. Identify potential solutions (Parking Solutions).
4. Work with stakeholders to evaluate the effectiveness, benefits, costs, equity impacts, feasibility and barriers of each potential solution. Use this information to prioritize these options.
5. Develop an integrated parking plan that identifies changes in policies and practices, tasks, responsibilities, budgets, schedules, etc.

## Travel Impacts

Abundant, free parking encourages driving and helps create dispersed, automobile-dependent land use patterns. Many Parking Management strategies significantly reduce automobile travel, as indicated in Table 2.

Automobile travel tends to be quite sensitive to parking supply and price. The Price Elasticity of parking is  $-0.1$  to  $-0.3$ , meaning that a 10% increase in parking charges reduces driving by 1-3% (Pratt, 1999). Charging cost-recovery prices (i.e., rates that recover the full costs of providing parking facilities) typically reduces drive alone commuting by 10-30%, particularly if implemented with other Commute Trip Reduction strategies (Analytics, 1995; Shaw, 1997).

Parking Management can help shift automobile travel to alternative modes, and improves access by creating more clustered, multi-modal land use patterns. As the number of parking spaces per employee in a commercial center declines, use of alternative modes tends to increase (Morrall and Bolger, 1996; Mildner, Strathman and Bianco, 1997). See Transport Elasticities and Land Use Impacts on Transport for additional information on how parking policies can affect travel decisions.

**Table 3 Travel Impact Summary**

| Travel Impact                                  | Rating | Comments                                  |
|------------------------------------------------|--------|-------------------------------------------|
| Reduces total traffic.                         | 3      | Reduces total driving.                    |
| Reduces peak period traffic.                   | 3      |                                           |
| Shifts peak to off-peak periods.               | 1      | If prices are higher during peak-periods. |
| Shifts automobile travel to alternative modes. | 3      |                                           |
| Improves access, reduces the need for travel.  | 3      | Allows higher-density, mixed land use.    |
| Increased ridesharing.                         | 3      |                                           |
| Increased public transit.                      | 3      |                                           |
| Increased cycling.                             | 3      |                                           |
| Increased walking.                             | 3      |                                           |
| Increased Telework.                            | 3      |                                           |
| Reduced freight traffic.                       | 1      |                                           |

Rating from 3 (very beneficial) to -3 (very harmful). A 0 indicates no impact or mixed impacts.

## Benefits And Costs

Parking Management can provide several types of benefits, described below. For additional information see [Parking Evaluation](#).

### Parking Management Benefits

#### *Efficiency and Savings*

Parking Management that reduces parking requirements can provide cost savings and increase consumer [Affordability](#). Parking is one of the largest transportation costs (Litman, 2002; [www.vtpi.org/tca/tca0504.pdf](http://www.vtpi.org/tca/tca0504.pdf)). A comprehensive Parking Management program that includes several strategies ([Shared Parking](#), more accurate parking requirements, pricing, [Cash Out](#), etc.) can often reduce parking requirements by 30-50% compared with generous minimum parking requirements, unpriced parking, and each space assigned to an individual motorist. With appropriate Parking Management motorists still have adequate parking, although they may need to walk somewhat farther, and pay directly rather than indirectly for parking.

The magnitude of savings that result from Parking Management depends on specific conditions, including the cost per parking space and how much parking can be reduced. Below are some examples of potential savings, assuming that a comprehensive Parking Management program can reduce parking requirements by a third, and annualized parking facility costs average \$1,200 in urban conditions and \$600 in suburban conditions:

- Cashing Out free parking is equivalent to a 3% wage increase for an employee earning \$40,000 per year at an urban location, and a 1.5% wage increase for suburban employees.
- If building rent represents 20% of a business's total costs, and parking represents 25% of rent costs, reducing parking costs by 40% results in a 2% reduction in total costs. If the business has a 10% profit margin, this increases profits by 20%.
- If two parking spaces are currently included with housing, decoupling parking (renting parking spaces separately) provides \$100 monthly savings for an urban household that only owns one vehicle, and \$200 monthly savings if it owns no vehicles. This represents a 12-25% reduction from a \$800 per month rent or mortgage payment. Suburban households save half this amount, a 10-20% savings from a \$500 per month rent or mortgage payment.
- If standard practices result in an average of two parking spaces per vehicle in urban areas and four spaces per vehicle in suburban areas, a 33% reduction in total parking requirements results in total annualized savings of \$800 per vehicle.
- Parking cost savings depend on the ability of facility managers to sell, lease or rent excess parking capacity. For example, if a business has 100 parking spaces, and its [Commute Trip Reduction](#) program reduces demand to 60 parking spaces, it will have 40 parking spaces that are no longer needed. The business will need to sell, lease or rent these spaces, or convert the

land to other uses, in order to benefit from this reduced demand. Parking brokerage services, perhaps through a Transportation Management Association, a chamber of commerce or other organization can help businesses capture parking cost savings.

### *Reduced Automobile Use*

Parking Management is one of the most effective ways to reduce motor vehicle traffic and achieve TDM objectives. Parking Management (Parking Pricing, Cashing Out parking, unbundling parking from housing) can reduce total automobile trips by 10-30%, and more if implemented as part of a comprehensive TDM program (see discussion of travel impacts above). This helps reduce traffic congestion, road and parking facility costs, road risk, pollution emissions and urban sprawl, and can increase Transportation Diversity.

### *Improved Design*

Parking Management allows greater flexibility in facility location and site design. It gives building managers and developers more options for dealing with parking problems. It gives communities more control over land use, allowing higher density, more walkable urban areas. It can facilitate the preservation of historic buildings and districts, and allows designers to position buildings to meet access, aesthetic and environmental objectives in ways that are impossible if parking requirements are inflexible. Such design flexibility is particularly important for infill development and areas with high land costs, allowing redevelopment of central business districts and urban communities (Voith, 1998). Parking Management is an important component of efforts to create more efficient and attractive urban conditions (New Urbanism).

### *Business Impacts*

Parking restrictions and pricing can reduce business activity in an area and shift travel to more suburban locations (Shiftana, 1999), although these impacts depend on specific conditions, including how prices are structured, and the quality of travel and location alternatives. When parking revenues are used to improve local streetscape conditions or to fund transportation alternatives they can increase business activity in a downtown (Kolozsvari and Donald Shoup, 2003).

### *Reduced Environmental Impacts*

Pavement imposes environmental impacts including reduced groundwater recharge, increased stormwater management requirements, reduced greenspace and wildlife habitat, and heat island effects (Land Use Evaluation). Parking consumes a significant portion of urban land, particularly in commercial and high-density residential areas. Parking Management can reduce urban sprawl and the environmental impacts that result (Willson, 1995).

## **Parking Management Costs**

### *Increased Management and Transaction Costs*

Parking Management often increases administrative responsibilities for public officials and facility managers, and additional responsibilities and inconvenience on motorists.

### *Spillover Impacts*

Parking charges and restrictions in one area may cause motorists to park in other areas where they create congestion problems. This may increase management and enforcement costs, and create conflicts between neighbors.

**Table 4      Benefit Summary**

| Objective                | Rating | Comments                                                                                                                |
|--------------------------|--------|-------------------------------------------------------------------------------------------------------------------------|
| Congestion Reduction     | 3      | Reduces vehicle travel, particularly in urban areas.                                                                    |
| Road & Parking Savings   | 3      | Reduces vehicle travel and parking requirements.                                                                        |
| Consumer Savings         | 0      | Mixed, depending on strategy. Reduces driving affordability but reduces indirect parking costs through taxes and rents. |
| Transport Choice         | 0      | Mixed, depending on strategy. Reduces driving affordability and convenience but improves other modes.                   |
| Road Safety              | 3      | Reduces vehicle travel.                                                                                                 |
| Environmental Protection | 3      | Reduces vehicle travel and the amount of land paved for parking.                                                        |
| Efficient Land Use       | 3      | Reduces vehicle travel and allows higher-density development.                                                           |
| Community Livability     | 3      | Reduces vehicle travel and the amount of land paved for parking.                                                        |

Rating from 3 (very beneficial) to -3 (very harmful). A 0 indicates no impact or mixed impacts.

## Equity Impacts

The Equity impacts of Parking Management depend on the type of strategies used, where and how they are applied, and the quality of transport alternatives. Strategies that reduce subsidies and charge motorists directly for the parking costs they impose tend to increase fairness (horizontal equity).

Some Parking Management strategies, such as parking Cash Out and Location Efficient Development can provide significant benefits to lower income and transportation-disadvantaged people. Most Parking Management strategies benefit people who are transportation disadvantaged by helping to create less automobile-dependent land use patterns, and reducing the parking costs they bear through taxes, rents and employment benefits.

Parking Pricing can be regressive, but overall equity impacts depend on how revenues are used and the quality of travel choices. If revenues are used to benefit lower-income households and there are good travel alternatives to driving, pricing and taxes can be progressive overall (Pricing Evaluation).

The table below summarizes the major equity impacts of various Parking Management strategies. Most tend to increase equity overall.

**Table 5** Equity Analysis of Parking Management Strategies

|                                | Treats everybody equally | Individuals bear the costs they impose | Progressive with respect to income | Benefits transport disadvantaged | Improves basic mobility |
|--------------------------------|--------------------------|----------------------------------------|------------------------------------|----------------------------------|-------------------------|
| More flexible requirements     | 1                        | 3                                      | 3                                  | 3                                | 0                       |
| Shared Parking                 | 0                        | 0                                      | 0                                  | Yes                              | 0                       |
| Priced Parking                 | 2                        | 3                                      | -2*                                | 2                                | 2                       |
| Cash Out free parking          | 3                        | 0                                      | 3                                  | 3                                | 0                       |
| Unbundled parking              | 3                        | 3                                      | 3                                  | 3                                | 0                       |
| Favor short-term parking       | 0                        | 0                                      | 0                                  | 0                                | 0                       |
| Address spillover problems     | 3                        | 3                                      | 1                                  | 3                                | 0                       |
| Location Efficient Development | 3                        | 3                                      | 3                                  | 3                                | 3                       |
| Restrict parking               | 2                        | 2                                      | 1                                  | 3                                | 1                       |
| Tax Parking                    | 1*                       | 1*                                     | 1*                                 | 1*                               | 0                       |

Rating from 3 (very beneficial) to -3 (very harmful). A 0 indicates no impact or mixed impacts.

\* Depends on who bears the cost, how revenues are used, and the quality of alternative modes.

## Applications

Parking Management can be applied in many situations (Evaluating Parking). It is particularly appropriate where:

- A specific parking problem exists.
- Land values and parking facility costs are high.
- Smart Growth and Transit Oriented Development are desired.
- Dense development and urban redevelopment are desired.
- Traffic congestion or vehicle pollution are significant problems.
- Excessive pavement is undesirable.

**Table 6** Application Summary

| Geographic                      | Rating | Organization                 | Rating |
|---------------------------------|--------|------------------------------|--------|
| Large urban region.             | 2      | Federal government.          | 1      |
| High-density, urban.            | 3      | State/provincial government. | 2      |
| Medium-density, urban/suburban. | 3      | Regional government.         | 3      |
| Town.                           | 2      | Municipal/local government.  | 3      |
| Low-density, rural.             | 1      | Business Associations/TMA.   | 3      |
| Commercial center.              | 3      | Individual business.         | 3      |
| Residential neighborhood.       | 3      | Developer.                   | 3      |

|                         |   |                           |   |
|-------------------------|---|---------------------------|---|
| Resort/recreation area. | 3 | Neighborhood association. | 3 |
|                         |   | Campus                    | 3 |

Ratings range from 0 (not appropriate) to 3 (very appropriate).

## Category

*Incentive to Reduce Driving and Land Use Management*

## Relationships With Other TDM Strategies

Parking Management supports and is supported by most other TDM strategies. Parking Management includes many Parking Solutions. It is often implemented as part of TDM, Commute Trip Reduction, Transportation Management Associations and Campus Trip Reduction programs, based on Contingency-Based Planning. It supports and is supported by Pedestrian and Cycling Improvements, Transit Improvements, Smart Growth, New Urbanism, Transportation Pricing Reforms and Context Sensitive Design. It is important for Location Efficient Development.

## Stakeholders

Parking Management programs are primarily implemented by local government policies and agencies, and by individual businesses. Implementation often involves changing current planning, enforcement and design practices, sometimes with the support of professional organizations. Transportation Management Associations can provide Parking Management and parking facility brokerage services (for example, maintaining a system to match businesses that have excess parking capacity with those that need additional spaces and arranging for parking facilities to be shared when appropriate).

## Barriers To Implementation

Parking Management often represents a significant change from current practices, and so requires overcoming various institutional and political barriers. Current parking policies are based on the assumption that maximum parking capacity is desirable. Current parking standards tend to be applied inflexibly, for administrative convenience, with little consideration of demographic, geographic and management practices that may affect parking requirements. Parking Management requires public officials, planners and business leaders to become familiar with the many Parking Management strategies and their potential benefits. Parking Management requires changing current development, zoning and design practices. It requires an institutional framework (such as TMAs and TDM Programs) and addressing concerns over spillover impacts.

## Best Practices

Best practices for Parking Management are described below, and in various documents listed in *References and Resources*. For more information see Evaluating Parking Policy.

- Parking policies should emphasize efficient use of resources. User information services, Shared Parking, Parking Pricing and overflow parking plans allow more efficient use of existing capacity and avoid the need for excessive requirements.
- The most convenient parking spaces should be managed and priced to favor priority users, such as people with disabilities, Rideshare vehicles, delivery vehicles, business customers and clients.
- Parking prices should be higher during peak-periods. There should be little or no discount for long-term leases.
- Parking should be considered a high-quality service. Signs, maps and brochures should be used to provide accurate information to users. Facilities should be attractive and safe. Users needs and potential problems should be anticipated.
- Parking services need not be one-size-fits-all. A parking facility may provide a variety of services tailored to different users, including valet services for premium users, convenient short-term parking for shoppers and delivery vehicles, longer-term

parking for commuters and residents, and special arrangements when appropriate for commercial users.

- Parking facilities should be integrated with overall facility and district design and style.
- Parking Management policies and programs should be coordinated through a district or region, so prices and management practices are consistent in comparable areas.
- Stakeholders should be consulted and involved in Planning parking policies and programs.
- New technologies should be used to improve user information, convenience and safety, and for control revenue.
- Parking management planning should anticipate potential spillover problems, and respond with appropriate regulations and enforcement programs. Enforcement should be adequate to maintain a high level of compliance, predictable and courteous.

#### Wit and Humor

A Texan with a big cowboy hat, boots and plenty of jewelry parks his sparkling new limousine in front of a bank in New York city, walks in, and says, "I'd like to borrow \$500 immediately."

The loan officer hands him an application form. For an address he writes, "Ritz Hotel." For collateral he writes, "Cadillac, estimated value \$100,000." The loan is approved and the satisfied customer hands the limousine keys to the bank in exchange for a \$500 check.

Two weeks later the Texan returns and returns the check, plus a \$5 bill for interest. Curious about this strange transaction, the loan officer inquires, "Sir, you are obviously rich. You have a valuable car. You stay at the fanciest hotel. You wear thousands of dollars worth of jewelry. Why did you borrow such a small sum and not even bother to cash the check?"

The man replies. "I didn't need the money. But where else can I park my car in central New York for two weeks for just five dollars."

## Examples and Case Studies

### *Tri-Met Parking Management ([www.tri-met.org](http://www.tri-met.org))*

The Tri-County Metropolitan Transportation District, which manages transportation in the Portland, Oregon area, has implemented various parking management strategies around transit stations to minimize costs and support Transit Oriented Development. These include:

- Arranging Shared Parking with Park & Ride and other types of land uses, including apartments, churches, movie theaters and government buildings near transit stations.
- Using lower minimum parking requirements around transit stations.
- Allowing Park & Ride capacity near transit stations to be reduced if the land is used for Transit Oriented Development, thus allowing car trips to access transit to be replaced by walk/bike trips.

### *Time-Based Pricing (K.T. Analytics, 1995)*

The City of Chicago raised rates at municipal parking lots by 30-120%, bringing prices in line with commercial operators. Parking demand declined 35%, and parking duration also decreased. Parking at nearby commercial lots did not change significantly. Local planners concluded that this reduction represented a shift from driving to transit or ridesharing, or shorter duration parking. The City of Eugene raised monthly parking rates at two municipal garages from \$16 to \$30 per month, and at several surface lots from \$6 to \$16 per month. Monthly parking sales declined from 560 to 360 parkers. About half shifted to ridesharing or riding transit, the other half apparently changed parking locations.

### *City of Monrovia Downtown Parking Management*

By Dick Singer, City of Monrovia Public Information Officer

It seemed a risk worth taking - locating a 12-screen, 2,400-seat movie theater in the middle of Monrovia's Old Town without providing the usual adjacent parking structure.



It made sense. Monrovia's Old Town business district is compact (six blocks long and two wide) and abutted by residential neighborhoods on three sides. Medium and high-density housing (mainly senior citizen) had been developed immediately adjacent to the commercial properties. Both MTA and Foothill Transit buses provide service to the edges of Old Town and Monrovia has an active dial-a-ride service providing door-to-door public transportation.

Old Town was redeveloped in the 1970s as a pedestrian-friendly "main street" shopping and service district. Free public parking lots and street parking combined to provide more than 1,200 spaces scattered throughout the district that were never more than 80% filled. For several years, a Friday night Family Festival street fair - running weekly from March through to Christmas - drew as many as 8,000 people on a typical summer night with very little overflow parking into residential neighborhoods. Additionally, most of the businesses using public parking for their employees closed at 5 p.m. and few stores stayed open past 7 p.m., meaning that a Shared Parking plan seemed feasible - daytime use for office workers and nighttime use for theater goers.

The theater was to go up on one of the public parking lots, so those spaces had to be replaced, and were by the expansion of another City-owned lot and the re-configuration of a sidestreet adjacent to both that lot and the theater site. When the theater opened, there were more spaces than before the project began. In its first six months of operation, the theater has attracted good crowds and the parking has yet to be a problem. Lot and street parking is sufficient to handle the demand and convenient enough so movie-goers will happily walk two-to-three blocks between their cars and the theater to stroll past shops and restaurants.

The shared-parking plan has worked well in the project's early stages. The second phase of our plan is now about to begin. Theater crowds are drawing a new business mix to the district (as planned) and we are aware that more nighttime business use will develop over the next year. An assessment district is now in the works to finance more Old Town parking - either a structure or an additional street-level lot - to handle the expected increase.

#### *Fee In Lieu Programs (Gray, 2004)*

In lieu fees allow developers to pay into a fund for off-site municipal parking facilities instead of providing their own on-site parking. Below are examples of such programs.

#### **Miami's Coconut Grove, Florida (an upscale neighborhood of Miami)**

Coconut Grove adopted a fee-in-lieu program in 1993 and has experienced considerable success. The fee is \$10,000 per stall, or payments of \$50/month/stall. Developers have opted out of 938 spaces, generating approximately \$3 million in revenues. The majority of the funds were used to develop a 416-space garage with ground floor retail. The fund also paid for a \$250,000 study for a downtown circulator, and \$100,000 for a Parking Mitigation Project, that included landscaping changes and installation of traffic control devices to improve parking and pedestrian access. Business licenses can be revoked after 90 days of non-payment.

#### **Lake Forest, Illinois**

Lake Forest has had a fee-in-lieu policy for about 15 years. All funds generated must pay for parking acquisition or development. The impetus was a desire to preserve the historic character of the downtown. The fee was recently increased from \$14,000 to \$22,000 per stall. The parking requirements are also relatively high in Lake Forest, at four spaces per thousand. Still, developers want to use the option because of the scarcity of developable land.

The city considers the program effective, and developers use the option frequently. Originally, it was an automatic opportunity for developers to pay instead of building. However, due to limited opportunities for the city to provide new facilities, they recently restricted the fee-in-lieu option to a special use permit.

#### **Jackson, Wyoming**

Jackson Wyoming adopted a fee-in-lieu policy in 1994, in conjunction with a new Comprehensive Plan and the adoption of parking minimums. The fee-in-lieu option was in response to concerns that the parking minimums would hinder economic development. The per-stall fee ranges from \$1,000 (up to four stalls) to \$10,000 (more than 41 stalls), depending on the number of stalls being opted out. The City does not have a specific obligation regarding timeline or proximity of new parking, but the funds raised are restricted to construction of parking only.

The policy is used frequently. When the fee-in-lieu was adopted, existing properties that did not have parking were given transferable parking credits, so that even as the properties have been redeveloped, there has been no parking requirement. The City Planner interviewed felt that a Local Improvement District would have been more effective for providing parking.

#### **Bend, Oregon**

Bend's policy was adopted in 1992. It was initiated due to concerns about constrained land for development. Developers have the option of building, leasing off-site, or paying the fee. The option has been used frequently but the fee was set very low (\$510 per stall). There are no specific obligations regarding timeline or proximity, but the fees must go into the parking fund and can pay for parking only (no TDM) either in or adjacent to the CBD. They are currently having their policy evaluated, with consideration of increased fee. The limited funds generated have become problematic with expectations from property owners for the city to provide for parking.

### **Skokie, Illinois**

Skokie adopted its fee-in-lieu policy in 1976. It was used primarily in the early 1980s, and once in the 90s, but not since. The city has high downtown vacancy rates (up to 40%), and parking shortages was not severe. The impetus for the policy was a desire to maintain the urban landscape, and to keep employee parking in the periphery of the core. The fee was set at \$3,500, which most businesses consider "outrageous". There were no specific guarantees regarding proximity, timeline, etc, but the money was limited to parking only. Developers do not have an option to variance out: they must either build parking or pay the fee. With adoption of a downtown redevelopment plan, the parking requirements were modified to a uniform one stall per 400 sf (commercial) and one per unit (residential). Most of the development recently has been mixed use with residential, so developers have provided parking.

### **Kirkland, Washington**

The City of Kirkland adopted a fee-in-lieu policy in the late 1970s for use in the downtown core. The fee is set at \$6,000 per stall, and has generated approximately \$300,000. Some of the funds were used to conduct various parking studies. In addition, a portion of the funds was contributed to a parking structure the city recently built, but was not a significant share. The city has no specific obligations regarding proximity or timeline, but has not had problems with expectations on the part of property owners. The impetus was to reduce create shared parking facilities. The primary use of the program has been for changes in existing properties to uses that require more parking (such as changing retail to restaurant). It has not been used for new development or redevelopment projects, and therefore the funds generated have been limited.

### **York Parking Information**

The first phase of a parking information system project introduced in York, UK will monitor traffic flow in each of the city's car parks and inform a central computer of any spare capacity. Real-time information will be relayed to a network of road-side variable message signs at key locations, providing motorists with early warning if a car park is full and where alternative parking is available. The project's initial stage is due for completion by June, with plans already underway to extend the system to accommodate other data such as where roadworks are taking place in the city. Information will also be supplied through a dedicated website which will be unveiled later this year.

The local authority said it had been "astonished" by the results of a study it undertook into ways to increase parking capacity, which found over half of the city's parking spaces were unused on most days. Councillor Tracey Simpson-Laing, the Council's executive member for transport, commented: "The problem most of the time is not that there is a lack of space, but that motorists simply don't know where the spaces are."

The launch of the new system, which is integrated into the Council's IT network, follows the piloting of a £1.3m (£900,000) information system providing up-to-the-second reports on bus services on the city's road network via electronic displays inside shelters. The system, using satellite navigation technology and onboard computers on buses, will enable traffic signals to be altered to allow late-running services to pass through junctions with minimal delay. If successful, the scheme will be rolled out across the city over the next two years.

### **Parking Cost Savings Make Retail Chain More Profitable**

"Mexican Chain Thrives Selling U.S. Surplus," *Wall Street Journal*, May 10, 2002, p. B1.

Retailer Saad Nadhir established a successful chain of discount stores in Mexico. One factor that contributes to his profitability is parking cost savings: "Even in the poorest U.S. neighborhoods, retailers give over as much as half of their space for parking, while in Mexico most shopper walk." With relatively low profit margins (volume retailers typically net just 5-15% on sales), a modest facility cost savings can significantly increase profits. For example, if 20% of a businesses' net revenues are typically devoted to building rents, 20% of building rents are devoted to parking facilities, and businesses currently earn 10% net profits, a business that reduces its parking requirements by half (perhaps by sharing parking or encouraging employees to use alternative modes) can increase its net profits by 20% compared with a competing businesses with otherwise comparable costs.

### **More Accurate Parking Requirements**

The City of Vancouver is developing a more flexible approach to parking requirements for multi-family dwellings to support

efficient transportation, smart growth and affordable housing planning objectives. City staff have proposed a Sustainable Transportation Credit Program that allows developers more flexibility based on their specific location and circumstances. The program is loosely based on the LEED TM Green building rating system. Developers receive credits for reducing the number of parking stalls, providing parking spaces for carshare vehicles, and providing annual transit passes to building occupants. [P1]

### *University of Wisconsin Parking Meters (NALGEP, 2005)*

To promote public transit use through more accurate price signals, the University of Wisconsin began replacing conventional parking passes, which provide unlimited use of parking facilities, with in-car parking meters that hang on rearview mirrors and work in conjunction with pre-paid debit cards, called "smart cards." Unlike traditional parking permits, these meters only charge users for the actual amount of time a vehicle is parked, allowing commuters to save money when they reduce their automobile trips. They have proven to be quite popular; there has been a waiting list for these new meters because demand far exceeded projections. In addition to creating better financial incentives for individuals to drive and park less, the parking meters are advantageous to the broader campus community. The personal meters collect valuable data regarding the use of specific parking areas for use by university planners. The in-car meters also eliminate the need for traditional meters and pay machines on campus, improving the visual landscape.

More than 600 Smart Parking Meters are now in use at the University. According to initial estimates by the partners, participation by 500 employees who curtail driving by one day per week can reduce VMT by 350,000 miles per year. In practice, demand for participation in the personal parking meter program has been much higher than projected, suggesting that larger benefits may be possible.

### *Smart Parking Signs*

New "smart parking" signs were installed December 2004 on the east side of the Caldecott Tunnel along Highway 24, alerting those headed toward the clogged Bay Bridge to the number of parking spaces available at BART's Rockridge station. It's the first time in the nation a "smart parking" program has been implemented to lure people onto transit, said Caltrans spokeswoman Tamie McGowen. It's part of a pilot program that uses real-time technology to lure people off the freeway and onto mass transit - either for last-minute shopping trips or workday commutes. "It's for people who would assume the station is full - but they'll see there is an opening and maybe they'll come in and try BART," said Jim Allison, spokesman for the transit system.

At the station, where parking typically is full by 7:30 a.m. or earlier, underground sensors are used in a reserved lot to relay information to freeway signs - much like parking garage signs tell drivers whether a floor is full. Commuters can call or use the Internet before leaving home to reserve one of the 50 parking spaces in the free test lot. Or, if traffic is particularly boggy en route to the Bay Bridge, a driver can watch the real-time message system to see if slots are available and call to claim one. After registering for the system, reservations can be made in advance three times during a two-week period.

### *Commercial Street Parking Management (CCS, 2001, [www.communityconsulting.org](http://www.communityconsulting.org))*

The character of Bay Ridge, NY is largely defined by its bustling retail streets: Third Avenue between 65<sup>th</sup> Street and Shore Road, Fifth Avenue between 65<sup>th</sup> Street and 96<sup>th</sup> Street, and 86th Street between Third Avenue and I-278. Easy access to Third and Fifth Avenue is important to nearby residents both for daily shopping needs and for the frequent contact with friends and neighbors that builds the strong sense of community that is the hallmark of Bay Ridge. Community leaders know that if the vitality of local retail streets is eroded, the special quality of Bay Ridge life is diminished, and local businesses lose their competitive edge with large retail centers that lure shoppers with abundant parking and express bus service.

Planners identified a number of potential ways to improve access to these commercial streets by parking management and encouraging use of alternative modes by shoppers and employees. After careful analysis of the options they identified several specific strategies that provided the equivalent of approximately doubling the local parking supply:

- Use Pay-And-Display parking meters rather than individual parking meters, which allow more vehicles to be parked on a length of curb.
- Encourage Shared Parking, to increase the utilization of off-street lots.
- Support Commute Trip Reduction programs for employees, such as TransitChek.
- Use angled rather than parallel parking.
- Use Variable Priced meters that are higher during peak periods, coupled with residential parking meters to avoid spillover parking problems.

Table 7 summarizes measures that were recommended for improving access, increasing parking supply and encouraging travel

alternatives in this area.

**Table 7 Commercial Street Access Improvement Measures**

| Measure                                                                                                                               | Potential Spaces         | Comments                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reduce need to drive                                                                                                                  |                          | Assumptions: Shopper cars per half hour - 540. Max. 5 min avg. wait for bus attracts 8% of drivers. Car service coupons attract 10% drivers. Home delivery gets 5% drivers to walk/bike to shop. 25% of staff who drive to work switch to transit. |
| Maximum 10 min bus headways                                                                                                           | 75                       |                                                                                                                                                                                                                                                    |
| Car service coupons                                                                                                                   | 50                       |                                                                                                                                                                                                                                                    |
| Home Delivery                                                                                                                         | 50                       |                                                                                                                                                                                                                                                    |
| TransitChek                                                                                                                           | 200                      |                                                                                                                                                                                                                                                    |
| Re-space bus stops to every three blocks. Reduce length of bus stops.                                                                 | 80                       | Requires significant effort in building public understanding of the local benefit and citywide equity. Citywide standard lengths should only be modified as part of a comprehensive relocation of bus stops.                                       |
| Create angle parking on wide streets (i.e., 4th Ave. and 86th St, 3-4th Aves)                                                         | 275                      | Could be tried during construction of 5th Ave. Adds resident parking in PM, safer streets, less thru traffic.                                                                                                                                      |
| Improve access/egress/finding spaces in 85th Street garage                                                                            | 175 (not in peak period) | Changing direction of approach, finding spaces, faster exiting are designed to achieve full utilization in off-peak periods. No parking credit taken for peak Saturday demand                                                                      |
| Install "Muni-meters" on 3rd and 5th Avenues                                                                                          | 200                      | Flexible use of space increases capacity by 20% on average, 15% on shorter blocks.                                                                                                                                                                 |
| Truck priority delivery times                                                                                                         | 0                        | Promotes mobility, some loss of parking in early AM.                                                                                                                                                                                               |
| Fire hydrants for truck unloading                                                                                                     | -50                      | Promotes mobility rather than adding parking capacity.                                                                                                                                                                                             |
| Improve pedestrian environment and mobility                                                                                           | 0                        | Reduces need to drive, through traffic movement ultimately reducing congestion.                                                                                                                                                                    |
| Shared use of off-street parking                                                                                                      | 300                      | Dyker Heights Beach Golf Course lot w/car service could be used by merchants and other long-term parkers. Too distant for shoppers.                                                                                                                |
| Value Pricing - variable meter fees for cars and trucks for time of day/day of week, best if coupled with residential parking permits | 1,000                    | Increases availability of metered spaces by at least 40% during peak period, provides incentive to use transit and remote parking, generates funds for improvements and enforcement, reduces overuse of residential streets.                       |
| Generate new revenues to build facilities, monitor, manage and expand program                                                         | 0                        | Need funding source and managing agent to collect and reinvest revenues in community improvements and to enhance all programs.                                                                                                                     |
| <b>Existing spaces</b>                                                                                                                | <b>1,420</b>             |                                                                                                                                                                                                                                                    |
| <b>Reduced demand or added spaces from program</b>                                                                                    | <b>2,180</b>             | Assumes full implementation, which is unlikely.                                                                                                                                                                                                    |
| <b>Total spaces</b>                                                                                                                   | <b>3,600</b>             | Includes near and mid term and existing spaces.                                                                                                                                                                                                    |
| <b>Total demand</b>                                                                                                                   | <b>3,000</b>             |                                                                                                                                                                                                                                                    |
| <b>Surplus spaces</b>                                                                                                                 | <b>600</b>               | Contingency for less than 100% success with other steps.                                                                                                                                                                                           |

#### *Parking Taxes (K.T. Analytics, 1995)*

Commercial parking is taxed as a percent of revenue in many cities, including Baltimore, New York, Pittsburgh, San Francisco, and Washington DC. Washington State allows local governments to tax commercial and employee parking.

#### *Campus Parking Management (Isler, Hoel, Fontaine, 2005)*

A survey of university campuses indicate that many are converting parking lots to buildings, fewer are adding parking capacity, and many are implementing various parking and transportation management strategies in order to devote more campus land to academic facilities rather than parking lots. Typical parking management strategies include permits, meters, cash-out program, prohibitive policy for freshmen, and eligibility based on residential location. Annual permit fees varied by

location of campus and location of a parking space within the campus. Various strategies are used to deal with spillover parking problems.

| Responses to Increased Parking Demand             | Frequently | Occasionally | Never |
|---------------------------------------------------|------------|--------------|-------|
| Build more surface lots in campus interior        | 6.1        | 24.2         | 69.7  |
| Build more parking structures in campus interior  | 16.7       | 53.3         | 30.0  |
| Build more surface lots on campus periphery       | 32.4       | 52.9         | 14.7  |
| Build more parking structures on campus periphery | 12.9       | 45.2         | 41.9  |

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